

Heroin Related Death in Chiang Mai

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Abstract

Drugs abuse is still one of the major problems in Thailand especially in Chiang Mai where is close to one of the main drugs supply area of the world called “Golden triangle” in the northern part of Thailand. Although methamphetamine is the most popular among drug abusers in Chiang Mai, heroin is still wide spreading especially in downtown of the city. In this study, we conducted a retrospective study of heroin related deaths examined in the department of Forensic Medicine, Chiang Mai University during 1996-2008. Demographics data, toxicological results and pathological findings were recorded. The results showed that during this period, there were 142 heroin related deaths. Only 102 cases were classified as heroin overdose fatalities. More than 95% were male and about 80% of those aged between 20-39 years. 48% of the cases were Thais, 14% were Americans and 13% were English. About 40% died in their residential areas, while 24% died in hotels. Autopsy findings in overdose group showed a needle mark (36%), cyanosis (41%), pulmonary edema (71%) and myocardium lesion (23%). Toxicological findings showed that 63% of cases were positive for serum morphine and 95% for urine morphine. The serum morphine were measured only in 14 cases in which the range was 164-8270 ng/ml. 6-monoacetyl-morphine (6-MAM) was analyzed only half of the cases and only 19% was detected. Urine 6-MAM also was detected only 63% of cases. Blood alcohol was taken only 45% and detected in 74% in heroin overdose victims. The range was between 2-385 mg% and median was 136.69 mg%.

Keywords: heroin, death, overdose, Chiang Mai

Introduction

Drugs abuse were still one of the major problems in Thailand. Even metamphetamine was highest incident. From DEA statistic of drugs related crime. Heroin was in the 3rd subordinated from metamphetamine and marijuana respectively.

From DEA data, Thailand especially Chiang Mai which closed to “Golden Triangle” known as one of the main drugs supply area of the world. Now a day, Thailand were used to be manufactured, epidemics, trade and transportation area for many drugs.

From our observation, we noticed that many tourists died from heroin overdose or sudden unexpected deaths which found opiates substance from toxicological investigation. That contribute us to study heroin related deaths in epidemiology ,demographic data, pathological finding ,toxicology.

Materials and Methods

This study was approved by The Research Ethics Committee on Human Research, Faculty of Medicine, Chiang Mai University.

A retrospective study, Review from reports of autopsy cases which heroin and its metabolite positive on toxicological reports during 1996-2008 at Forensic Department ,Faculty of Medicine, Chiang Mai University. In epidemiology ,demographic data, pathological finding ,toxicological results that were recorded.

Case Selection

As unnatural deaths or suspected which opioids positive from toxicology reported even co-incident or overdose. We reviewed all 142 deaths investigated by Forensic department in faculty of medicine in Chaing Mai university between 1996-2008.

The remaining 40 cases were considered not to be an overdose if autopsy or circumstances of death indicated a non-overdose cause of death, even when opioid intoxication may have played a significant role e.g., falls, motor vehicle accidents or autopsy pathology indicated another cause of death that could have been sufficient to cause death in the absence of opioids e.g., heart attacks . The remaining 102 cases were considered overdoses.

Results

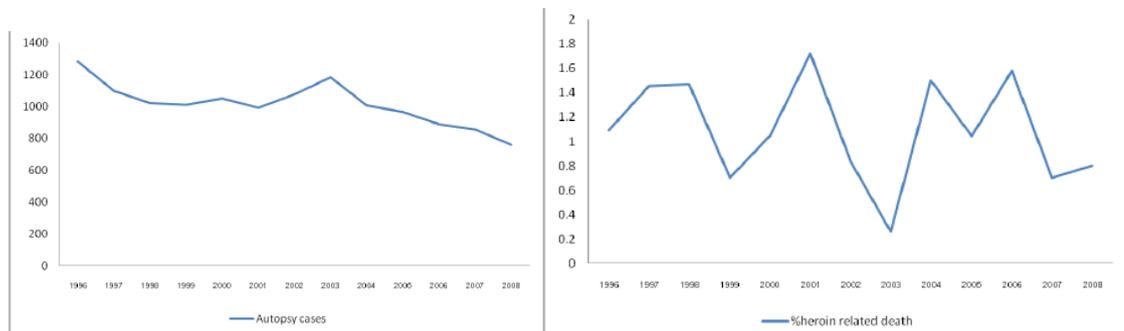


Figure 1 Incidental cases compare with autopsy cases during study.

As figure 1, We compare incident of heroin related death with autopsy cases each years. We found highest incident in 2001(1.72%) follow by 2006 (1.58%), 2004(1.50%), 1998(1.47%) and 1998(1.45%) respectively. Lowest incident in 2003 (0.26%) And we found heroin related death in range 0.26%-1.72% of autopsy cases.

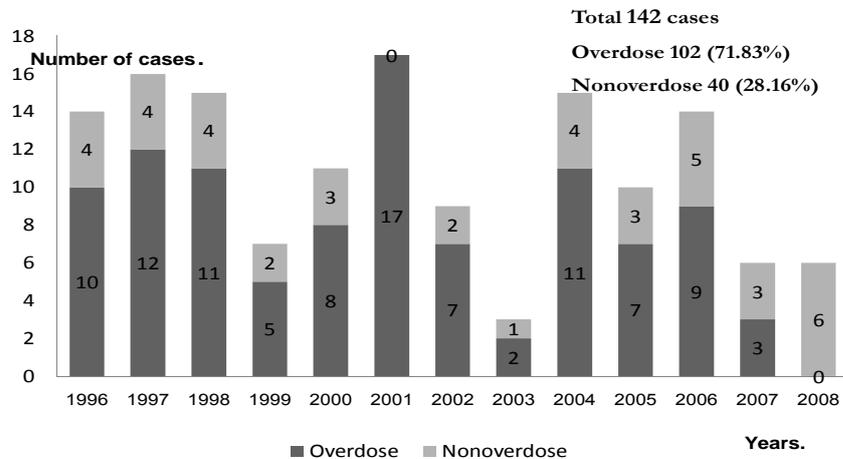


Figure 2 Study groups in each years, describe as overdose and non overdose group.

From study group as Figure 2. All heroin related deaths 142 case, we describe as overdose group 102 cases(71.83%) and non overdose group 40 cases(28.16%). In overdose groups found highest incident in 2001 follow by 1997, 1998, 2004 respectively and lowest incident in 2008.

Sex.

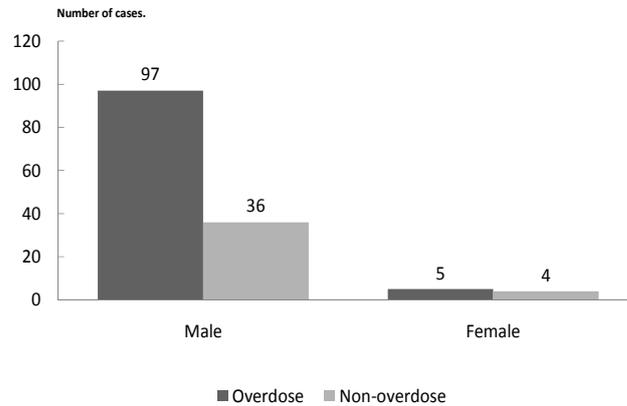


Figure 3 Study compare by sex in both overdose and non-overdose group.

In both groups, There were highly incident in male compare with female, in overdose group we found 97 (95%) described as male, and 5 (5%) were described as female. While non-overdose group were 36 (90%) described as male, and 4 (10%) were described as female.

Age.

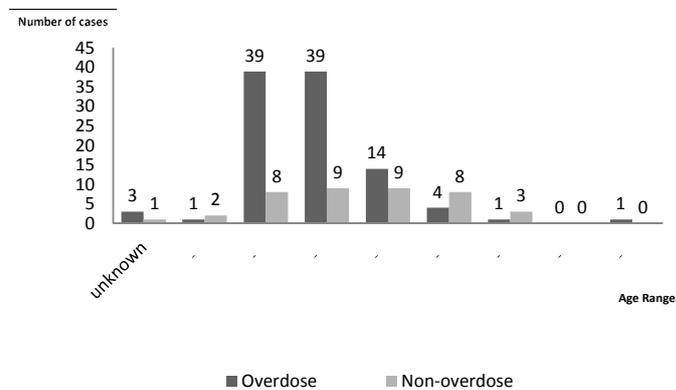


Figure 4 Study compare by age in both overdose and non-overdose group.

In overdose group we found median age of death was 32 years (range 17–86). Younger deaths were predominantly high density (78%) by aged 20-39 years. While Non-overdose group were 35 (87.5%) described as male, and 5 (12.5%) were described as female with age predominate in 20-59 years.

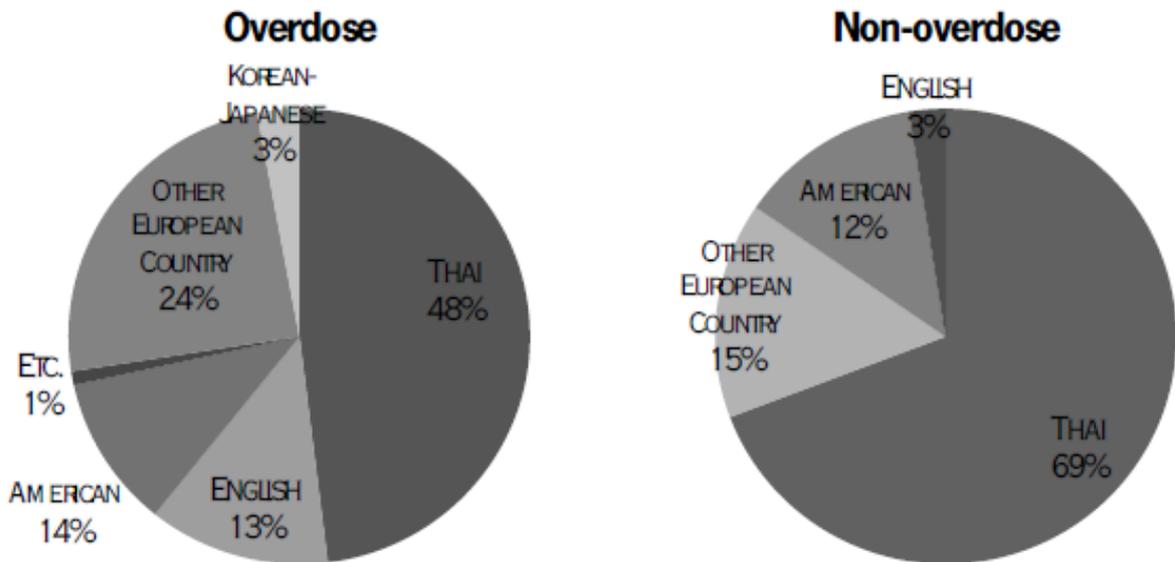


Figure 5 Race density compare in both groups.

As Figure 5 during our study, Thai still have high incident predominantly in both groups (48% in overdose group and 69% in non-overdose group) . Foreigners incidence highly in Others European country (24%) , American(14%) and English(13%) in overdose group. And non-overdose groups, Others European country (15%) and, American (12%). In our study, European countries were mention to France, German, Switzerland, Italy, and Sweden.

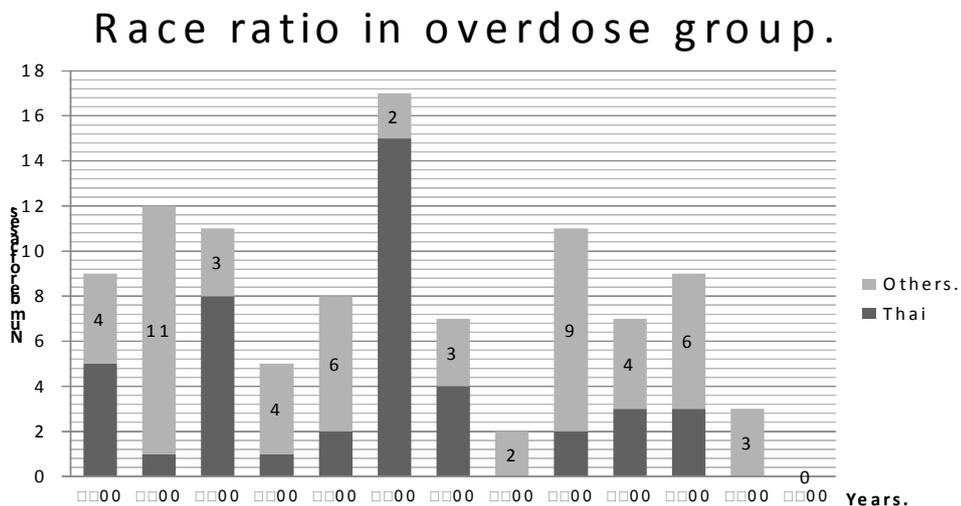


Figure 6.Race compare by Thai and foreigner in overdose group each years.

Months.

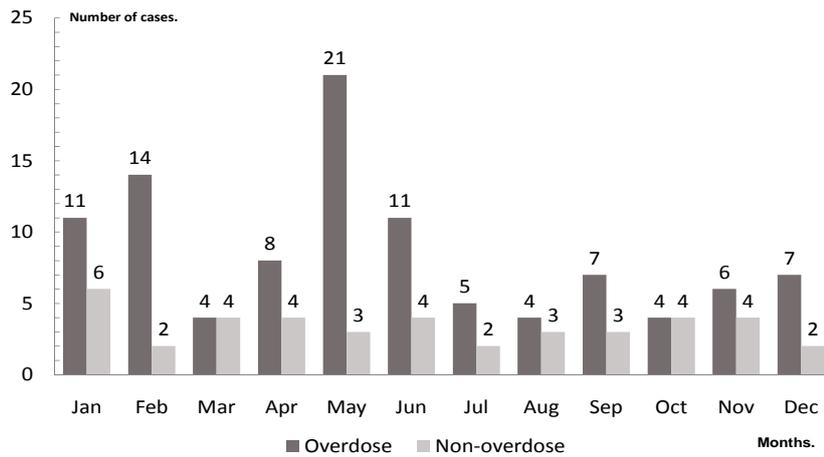


Figure 7. Incident compare by month in both groups.

As figure 6, In overdose group we found that almost years foreigner still had high incident than Thai especially in 1997 follow by,2005,2000. On the other hands, Thai had high incident than foreigner in 2001 and follow by 1998. There's no predominate month in non-overdose group. But in overdose group May is predominately follow by February, January and June respectively as figure 7.

From our study, location of death in overdose groups were mainly in resident(40%) follow by hotel(24%) and hospital (12%)

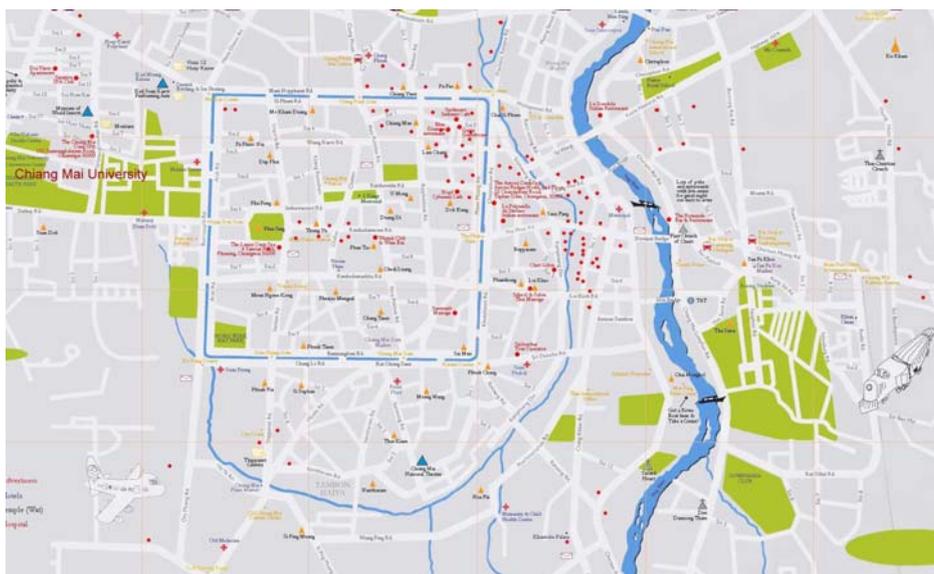


Figure 8. Geographic map. Represent location of death. in capital city of Chiang Mai.

From figure 8, demonstrated incident location. The study show high density incidence confine in the Northeast of city and surrounding area known as “ Night Barsar “ which is overcrowded with tourists.

Finding.	Overdose. n=102	Non-overdose. n=38
Cyanosis.	41(40.4%)	14(36.8%)
Needle mark.*	36(35.3%)	3(7.8%)
Pulmonary edema.**	71(71.8%)	14(36.8%)
Myocardial lesion.	23(22.5%)	11(28.9%)

Table 1. Pathological finding in both groups.

From overdose group, we found needle mark 36%, cyanosis 41%, pulmonary edema 71% and myocardium lesion 23%. While non-overdose group found needle mark 7.5%, cyanosis 35%, pulmonary edema 35% and myocardium lesion 30%. Especially in needle mark and pulmonary edema were statistic significant. (p value = 0.001)

Location.	Sample (n)	Detection (%).
NASALSWAB.	20	55
TRACHEALSWAB.	12	33.33
BILE.	9	100
LIVER	6	100

Table 2. Others route of detection in overdose group.

Cause of Deaths.	Numbers.
HEART DISEASE.	7
GUNSHOT INJURIES.	5
TRAFFIC INJURIES.	5
HANGING.	4
OTHERS NATURALDEATHS	19

Table 3. Cause of deaths in non-overdose group.

From table 2. In overdose group, we found nasal swab 55%., tracheal swab 33.33%, bile 100% and liver 100%. Which bile and liver were detected in decomposition cases only. In non-overdose group, Cause of death was predominately in heart disease others were traffic injuries, gunshot injuries, and hanging quite similar pattern.

Substance.	Samples (n).	No. of detection.	Median	Range	Samples (n).	No. of detection.	Median	Range	P value
ALCOHOL.	47	29(74.35 %)	139.69 Mg%	2-385	16	5(25.39%)	12 Mg%	2-305	0.009
SERUM MORPHINE	102	63(62.37 %)	711(NG/ML.)	164-8,720	38	13(34.21 %)	-	-	0.002
SERUM 6-MAM	36	7(19.45%)	890(NG/ML.)	62-1,767	7	0(0%)	0	-	0.062
SERUM CODEINE	36	8(23%)	119.50(NG/ML.)	44-1472	5	3(60%)	0	-	0.005
URINE MORPHINE	82	78(95.13 %)	1,880.50(NG/ML.)	198-24,118	36	34(94.44 %)	1,389(NG/ML.)	174-15,647	0.214
URINE 6-MAM	36	23(63.89 %)	940(NG/ML.)	145-7,338	10	6(60%)	1,001(NG/ML.)	158-2,334	0.949
URINE CODEINE	36	22(61.11 %)	688(NG/ML.)	204-3,978	9	9(100%)	888(NG/ML.)	254-4,845	0.647

Table 4. Toxicological Study

In overdose group, Blood alcohol were available for 29(74.35%) of cases (n=47). Median of BAC was 136.69 mg%(range 2-385 mg%) while non-overdose group, Blood alcohol were found 25.39% of cases (n=16). With range 2-305 mg% and Median of BAC12 mg%.

Serum morphine were detected 63(62.37%) of cases. (n=102.) in overdose group. And levels available for 14 cases with median serum morphine level were 711 ng/mL (range 164-8,720 ng/mL). while urine morphine were found 78(95.13%) of cases (n=82). And levels available for 24 cases. With median serum morphine level was 1880.50 ng/mL (range 198-24,118 ng/mL).

While non-overdose group, Serum morphine were detected 13(34.2%) of cases (n=38). And no levels available. And urine morphine were found 34(95.13%) of cases. And levels available for 14 cases. Median urine morphine level was 1,389 ng/mL (range 174-15,647 ng/mL).

In overdose group, serum 6-MAM found 7(19.45) % of cases (n=36) . Median serum 6-MAM level was 890. ng/ml.(range 62-1,767 ng/ml). while urine 6-MAM were found 23(63.89) % of cases (n=36) . And levels available for 19 cases. Median urine 6-MAM level was 940 ng/ml (range 145-7,338 ng/ml). While non-overdose group, Serum 6-MAM were not found (n=7). while urine 6-MAM

were 6(60%) of cases (n=10) . And levels available for 5 cases. Median urine 6-MAM level was 1,001 ng/ml (range 158-2,334 ng/ml).

Serum codeine were found 8(23%) of cases (n=36). In overdose group, and levels available for 8 cases. Median serum codeine level was 119.5 ng/ml (range 44-1,472 ng/ml). While urine codeine were found 22(61.11%) of cases (n=36). And levels available for 17 cases. Median urine codeine level was 688 ng/ml. (range 204-3,978 ng/ml).

While non-overdose group, Serum codeine were taken 5 cases and detected 3(60%).and no level were reported. But urine codeine were found 100% (n=9). Median urine codeine level was 888 ng/ml (range 254-4,845 ng/ml).

From Table 4, by compare both groups. We found serum morphine and serum codeine have statistical significant between overdose and non-overdose groups. With p-value = 0.002 in serum morphine groups and 0.005 in serum codeine. While BAC, serum 6 MAM and all urine study had no statistical significant between both groups.

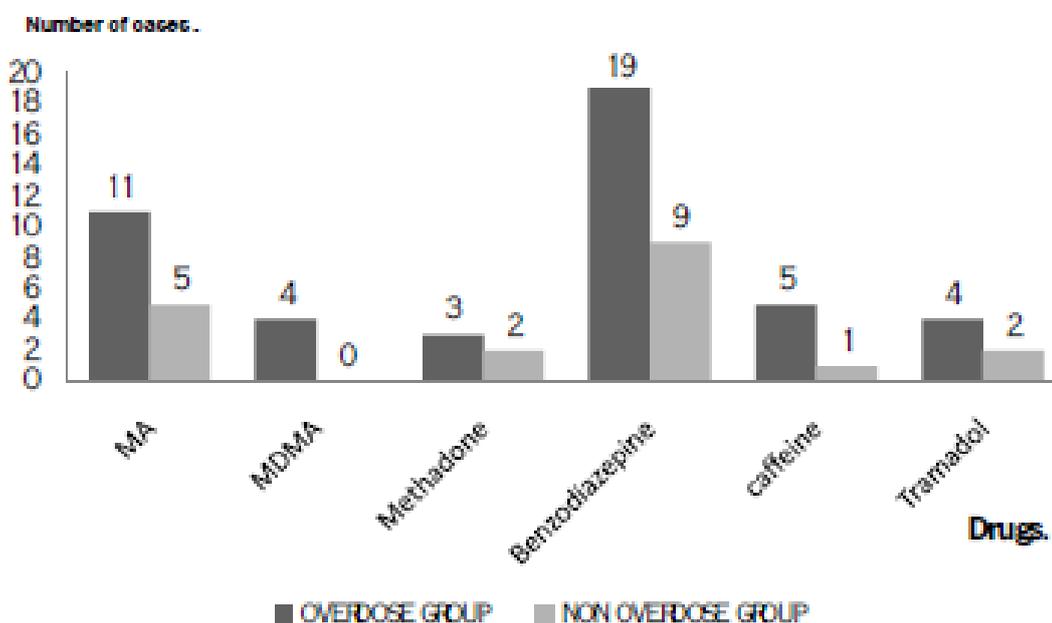


Figure 9. Major multiple drugs used in both groups.

From figure 9. Major toxicological combine used in both groups were predominately in Benzodiazepine group follow by Met-amphetamine.

Discussion&Conclusion

We conducted a retrospective study of heroin related deaths examined in the department of Forensic Medicine, Chiang Mai University during 1996-2008. The results showed that during this period, there were 142 heroin related deaths. Average 10-15 cases per year (0.26-1.72%) which highest incident in 2001 and lowest in 2003.

From our study only 102(71.83%) cases were classified as heroin overdose fatalities from Forensic doctors. More than 95% were male and about 80% of those aged 20-39 years. Heroin has been widespread especially in downtown and surrounding area known as "Night Barsar"

There was 48% Thais, 14% Americans and 13% English. In overdose group we found that almost years foreigner still had high incident than Thai especially in 1997. On the other hands, Thai had high incident than foreigner in 2001. About 40% died in their residential areas, while 24%died in hotels. And months was predominating in May.

In overdose group, Blood alcohol were found for 74.35%(n=47). Median of BAC was 136.69 mg%(range 2-385 mg%) while non-overdose group, Blood alcohol were found 25.39% (n=16). With range 2-305 mg%. In both groups, The range of BAC in recreational use, lethal dose > 450 mg%³. As a previous report, A. Seymour et al¹⁴, Alcohol were detect 43% and concentration found range 5-462 mg%.

From Davidson et al¹¹, Alcohol was detected 46% (n=333.) A blood alcohol level were available for 145 cases, with median 140 mg% (range 20-430 mg%).

Serum morphine were detected 62.37%(n=102.) in overdose group with median serum morphine level was 711 ng/mL (range 164-8,720 ng/mL). And median serum morphine level was 1880.50 ng/mL (range 198-24,118 ng/mL). While non-overdose group, Serum morphine were detected 34.2% (n=38). And no levels available. Previous report, A. Seymour et al¹⁴, Heroin was detected 72% in overdose cases. And C. Staub et al¹³, Morphine concentrations have been determined in 52 actual forensics cases, 42 men and 10 woman, average age was 28.5 years. (range 18-39 years.) morphine concentration range 5-2,050 ng/ml. average value 710 ng/ml.

And no significant level of serum codeine was found. From Davidson et al¹¹, serum morphine levels were available for 92 %. Median serum morphine level was 240 ng/ml.(range 10-

650 ng/ml.) The ranges of serum morphine levels in therapeutic use, recreational use and use resulting in fatalities.

While urine morphine were found 95.13%(n=82) . And urine morphine were found 95.13% . Median urine morphine level was 1,389 ng/mL (range 174-15,647 ng/mL). The range of serum morphine level were in therapeutic and lethal dose > 200 ng/ml³.

In overdose group, serum 6-MAM found 19.45 %(n=36) . Median serum 6-MAM level was 890. ng/ml.(range 62-1,767 ng/ml). while urine 6-MAM were found 63.89 %(n=36) .Median urine 6-MAM level was 940 ng/ml (range 145-7,338 ng/ml). While non-overdose group, Serum 6-MAM were not found (n=7). while urine 6-MAM were 60%(n=10) . Median urine 6-MAM level was 1,001 ng/ml (range 158-2,334 ng/ml). Serum codeine were found 23%(n=36). In overdose group Median serum codeine level was 119.5 ng/ml (range 44-1,472 ng/ml). while urine codeine were found 61.11%(n=36). Median urine codeine level was 688 ng/ml. (range 204-3,978 ng/ml). While non-overdose group, Serum codeine were detected 60%. But urine codeine were found 100% (n=9) . Median urine codeine level was 888 ng/ml (range 254-4,845 ng/ml). The range of serum codeine level were in therapeutic and lethal dose > 200 ng/ml³.

By compare both groups. We found serum morphine and serum codeine have statistical significant between overdose and non-overdose groups. With p-value = 0.002 in serum morphine groups and 0.005 in serum codeine. While BAC, serum 6 MAM and all urine study had no statistical significant between both groups.

Nasal and trachea swab were detected 55%,and 33% From overdose group, Bile and liver in case of detection found positive in all cases. In this study, Autopsy findings in overdose group showed a needle mark (36%), cyanosis (41%), pulmonary edema (71%) and myocardium lesion (23%) with statistical significant in needle mark and pulmonary edema between bothgroups.

Cause of death in non-overdose group mainly heart attack others were traffic injury, gunshot injury, and hanging. Both groups have the same drug combination pattern mainly was Benzodiazepine, and Met-amphetamine.

In the future, we hope our study will be useful for prevention, sign, symptom for treatment and epidemiology for reduce drugs abuse problem in our society.

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